INFORMATICS INSTITUTE OF TECHNOLOGY

UNIVERSITY OF WESTMINSTER

INFORMATICS INSTITUTE OF TECHNOLOGY

In collaboration, with

UNIVERSITY OF WESTMINSTER (UoW)

BSc/ BSc (Hons) in Computer Science

Final Year Project 2017/18

Project Initial Document

For

User Experience Enhancement in Scrum using Gamification Elements

By

2014081

Vishwa Kanahcna Perera

Supervised by

Mr. Pumudu Fernando

Signature of Supervisor

Signature of Student

Table of Contents

List of Tables

List of Figures

List of Abbreviations

Abbreviation	Meaning
CV	Curriculum Vitae
DAD	Disciplined Agile Delivery
DSDM	Dynamic Systems Development Method
FDD	Feature-Driven Development
HDD	Hard Disk Drive
OS	Operating System
RAD	Rapid Application Development
RAM	Random Access Memory
RIPP	Rapid Iterative Production Prototyping
SSD	Solid State Disk
XP	Extreme Programming

1 Project Background

1.1 Introduction

In Software Industry, Rapid Iterative Production Prototyping (RIPP) is an idea that was concaved out of dissatisfaction with waterfall software design approach which often caused to produce outdated products or inefficient product by the time it is being released to the market. In order to achieve higher outcome James Martin, Arthur of Rapid Application Development (RAD) stated the philosophy focused on quickness in using techniques like prototyping, Iterative development and Time boxing.

Even recently, Agile methodologies are showing a reasonable growth in adaptation in project management area. Mostly due to its RAD development foundation. Under Agile there are different types of Variations in adaptation/Methodologies. Such as; Scrum, Extreme

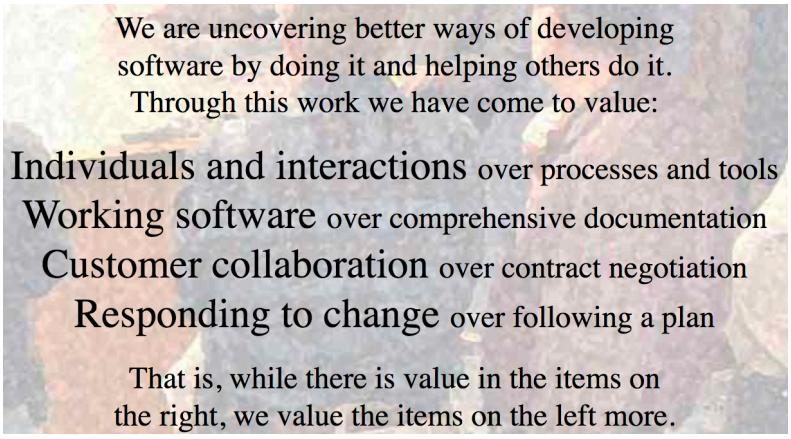

Figure 1: Common vision stated in Agile Manifesto (Agilemanifesto.org, 2017)

Programming (XP), Crystal, Dynamic Systems Development Method (DSDM), Lean Development, and Feature-Driven Development (FDD). Each methodology has a unique approach while having the common vision and core values which is stated in Agile Manifesto.

All these methodologies contain continuous planning, continuous implementation, continuous testing. In other terms, continuous evolution in both software and project. Methodology which will be chosen by the team varies according to the requirement classifications in the project. Among such, Scrum methodology has shown most effective productivity against the uncertain requirements and in places where there is a large part of the figuring out certain parts in the software.

The term scrum was introduced in a *"Harvard Business Review" article from 1986 by Hirotaka Takeuchi and Ikujiro Nonaka. It turned into a part of Agile when Ken Schwaber and Mike Beedle composed the book "Agile Software Development with Scrum" in the year 2001"* (Westland, 2017). Scrum is a well define software development process under above mention qualities. But the Problem that the author focus on is, Experience which the developer happens to go through in a Scrum. Even though theoretically it must be positive, there are occasions where developer undergo dissatisfactions due to certain qualities of the Scrum itself.

As an example; Since the product owner has the full authority in deciding which feature should be there and which should not be there, there occurs situations such product owner decided to remove a feature which the developers been developing for quite some time. At moments like this, Developer's frustration builds up. The author himself has being in a situation as such during his Industrial training period.

This Motivated the author to take this as a final year project problem as it's a requirement of BSc (hons) Computer Science. Also, author believes that using of proper gamification elements could be the solution for the user experience issues with in the Scrum methodology.

1.2 Define the Problem

Reduction of motivation and user engagement with-in developers due to uncertain decision by product owners and lack of resources within the company.

1.3 Project Rationale

As Scrum was there for some time, there are several occasions where Scrum has been modified into some other hybrid methodologies, such as Disciplined Agile Delivery (DAD). Which is to tackle the filling in the process gaps that Scrum purposely ignores.

But as per combined solution, which is using of Gamification Elements on Scrum, in order to boost productivity first came into play when "Davi Gabriel da Silva" who is certified Scrum Master put forward his idea on avoiding bad practices on Scrum using gamification elements. He quoted Gartner, saying that *"gamification is a living trend"* (Scrumalliance.org, 2017).

Gamification was initially introduced to the grab the attention of the customer and to boost the sales outcomes, in recent times almost every software which is built focusing the human interaction has somewhat of a gamification element included. Davi, further explained "*By those end about 2015, he predicts, more than 50 percent of associations that bring improvement techniques will gamify them."* (Scrumalliance.org, 2017).

With saying that, purpose of the project is to, give out a positive experience for the developers who are practicing Scrum. To boost the enthusiasm and engagement of the developers which will then give out the productivity as a bi product. In modern days, work space enthusiasm is major concern as per retaining employees for a longer period of time. Which will support the upward progress of the company.

2 Problem Domain

As defined by the author, this system only consisted of user experience issues faced by developers in practicing Scrum methodology and Scrum methodology alone. Although there might be similarly methodologies which are somewhat similar with Scrum (methodologies such as Kanban, Agile or DAD) Author does not validate the User experience enhancement in a such system. Since this solution will only be tested under the Scrum methodology practices.

Although the project is more focused on the small-medium size companies where there are only few in the development crew and the resource management is mandatory. Applying the same solution to a large-scale company might not reduce any stability in the solution.

2.1 Persona 1

John is a dedicated Software Engineer who works hard. He was given a certain feature to develop in the project he was working on. John worked day and night to get this feature up and running. Most of the time John ended up fixing minor bugs and refining the feature which was given to him. Few days prior to the launch Product owner decides to remove the feature which John worked so hard.

- In persona 1, John ends up with dissatisfaction as he ends up in a situation where he feels like he has not done anything productive throughout the project period.

2.2 Persona 2

Julia has been practicing Scrum for a long time and has been on a Scrum team for a long time. Due to lack of resources company wanted to move Julia from team A to team B, but the company does not have any trace of Julia's pass work within the company or how much of a match would Julia be for the Team B.

- In persona 2, Company has to perform an action without any risk mitigation, as Scrum team perform well when the team member's personality traits are well synced.

3 Conclusion

So far for these types of questions, there is no such solution which is directly addressing these issue, but if existing popular project management systems like Atlassian JIRA, Trello or Microsoft Projects were taken into consideration, they do provide a good project management environment but never keeps historical data in order to produce a Curriculum Vitae (CV) of each team member about their performance.

3.1 Features of the proposed system

In order to resolve this type of problems, the author suggests a system which practices Scrum methodology along with gamification elements. In order to keep historical data of each user and produce a CV which gives out an analysis of each user individual. A system which can analyze data in order to produce a report of each and a summary of comparison of user along with the team.

In addition to that, since software developers prefer intrinsic[1] rewards over extrinsic[2] rewards. Use of gamification elements is necessary for user to feel accomplished.

4 Aim

Author's aim is to create a hybrid Scrum methodology, providing a gamified solution for the user experience issues in Scrum. Reduction of motivation and user engagement with-in developers due to uncertain decision by product owners and shuffling team members with other teams due to lack of resources within the company.

5 Scope

5.1 Inclusions

As core features;

System will only focus on Scrum methodology. System includes gamification elements in order to boost the engagement of developers who uses the hybrid Scrum methodology which is being put forward by the author. System gathers data of each developer who uses the system and perform an analysis in order to produce a CV, which includes, details of each member and his/her performance analysis. System will be developed as a web application, as it makes the cross-platform expansion much easy.

As other features;

System includes a browser plugin in order to make the system easy to access for developers.

5.2 Exclusions

System will not take other software development methodologies into account in terms of optimization as it will only be optimized for the Scrum methodology. Project is focused around the user experience enhancement in Scrum for developers and all the other enhancements which happens alongside will only consider as bi products.

System does not include a full pledge project management eco-system, but a prototype system which included all the feature in order to demonstrate the user experience enhancement.

6 Rich Picture

7 Objectives

7.1 Research Objectives

- Gather information on different gamification mechanism.
  - ⇒ in order to produce the best user experience first task would be analyzing all the gamification mechanisms which have developed up till now and to choose which is best suitable for the Scrum methodology.
- Analyze the Scrum framework in depth.
  - ⇒ To apply gamification machines in the Scrum framework, knowing all the sensitive part in the framework is a must, and to avoid damages to the Scrum framework by any means.
- Analyze current software systems which is practicing Scrum methodology.
  - ⇒ There are several software's which practices Scrum framework (Atlassian JIRA, Bitrix24, Trello). Which include set of basic features which represent the core features of the Scrum. Analyzing which is necessary and which is additions is a must before producing a new system.
- Analyzing Gamification mechanism in depth.
  - ⇒ It is said that not every gamification mechanism will fit in with everything, It is necessary to do a survey to find out which mechanism will be the most appropriating to enhance the experience Scrum for the developer.
- Analyze existing systems with the gamification.
  - ⇒ In order to achieve the expected user experience, it's always a plus point to analyze the pros and cons in existing systems, which may or may not include gamification aspect.
- System comparison after the adaptation of the gamification elements.
  - ⇒ Checking the improvements and deteriorations of the system after the adaptations of the selected gamification mechanisms
- Produce a Scrum user profile.
  - ⇒ In order to make the member shuffling in between teams more compatible.
- Personal trait analysis of each user.
  - ⇒ Analysis of data in the user profile, in order to check the analysis, the compatibly of one user with another.

7.2 Common Objectives

- Project Initial Document
  - ⇒ Report which includes the details about the initial idea of the project.
- Literature Review
  - ⇒ Report which in detail explains about the project while critically evaluating the previous work done by others.
- System Requirement Specification
  - ⇒ Report which describe about the features and the way system or software behave.
- Interim Report
  - ⇒ Report which includes all the work done up till half of the semester.
- Prototype
  - ⇒ Initial version of the final product which is expected by the end of the project.
- Final Report
  - ⇒ Report which would include all the work about the project.

8 List of Requirements

8.1 Hardware Requirements

Note: The system does not require a high-end computer as the system itself is light weight. IT can even run on a very basic computer configuration.

* Preferred ** Minimum Necessity

Hardware	**Reasoning**
Core i5 Processor 6th Generation*	As this software works along with other developing tools, as an industrial standard, i5 Processor is preferred in order to have a smooth working environment.
120GB Solid State Drive (SSD)*	SSD has a huge performance bump over Hard Disk Drive (HDD). SSD is preferred in order to achieve the maximum performance.
8GB Random Access Memory (RAM)**	8GB of RAM is necessary, as the developing tools consume huge amount of RAM, with this software running in the background.

8.2 Software Requirements

* Preferred ** Minimum Necessity

Software	Reasoning
Mac Operating System (OS)*	As Mac OS provide a good resource optimization and performance optimization grantee.
Firefox Quantum Developer Edition Web Browser*	New Firefox Quantum Developer Edition offers features to eased up the developing and debugging experience. At the same time, it consumes 30% less RAM when it's been compared with Google Chrome

9 Research Design

9.1 Approach

The research will follow up an indicative research but as per justification of some aspects of the research, deductive research will also be used.

9.2 Data Collection

Author is positive about going ahead with a mixture of both qualitative and quantitative methods in order to achieve the best results. As it follows up both inductive research aspect and deductive research aspect.

- Mixture of both Qualitative and Quantitative:
  - ⇒ Research is mostly about user experience, so to create a solution which will affect the majority needs quantitative data.
  - ⇒ Since the research areas is about enhancing user experience, and in order to justify the behavioral pattern of targeted audience, qualitative data is necessary.

9.3 Data Analysis

Author declares that the research will follow a theoretical study (case study research). As this research will be developed a system under a hypothesis, "gamification could enhance the

engagement of a user and solve unsolved user experience issues within in the Scrum methodology from the point of view of the user."

Furthermore, a secondary analysis will take place in order to generalize the solution for the majority. By comparing the solution with large data set available on internet. Through a secondary analysis, trends and social changes could also be taken into account.

9.4 Data Evaluation and Testing

System will undergo black box testing and white box testing. Furthermore, author is planning on performing an alpha testing in order to justify the solution is adequate.

10 Project Management

10.1 Project Management Methodology

With time boxing, Author has happened to choose a Project Management Methodologies (PMM) from the Methodologies which he is familiar with.

	Agile	**Scrum**	**Waterfall**
Changes	Are embraced	Easily accommodated	Can't be easily accommodate
End goal	Can be unknown	Partially known	Known
Efficiency	Fast, High quality Delivery	Poorly define tasks may lead to inaccuracy	Easy to use and manage
Improvements	Continuous	Accountable	May get added up for future enhancements
Planning	Less Concert	Risk of Scope Creep	Well Planned
Documentation	Might get neglected	Might get neglected	Well Documented
Final Product	Not fixed	Partially fixed	Fixed

Even though Scrum Methodology is more aligned with the requirements of the projects, it alone can't be used in this project. As this project will be developed by just 1 developer. All the roles in the Scrum and all the mechanics in Scrum won't be followed. There for a mixture of Methodology mechanics will be used during the project management.

10.2 Risks and Mitigations

Risk	Mitigation method	Chosen Solution
Deletion of source code/ documentation	Maintaining documents/ code in a version control.	Git (Github)
Over sleep	Maintaining a proper time table to work.	Fantastical
Misplacing of supportive research articles	Maintaining a cloud based system to store research articles	Mendeley
Scope Creep	Keep and extra time allocated in Scrum.	Bitrix24
Spelling mistakes and grammar mistakes	Proof reading both using manually and using a software	Ginger
During Data Analysis, Secondary data which was used to compare the system was gathered for the different purpose	Compare data with only generalized survey data, and avoided specialized data.	---------

10.3 Gantt Chart

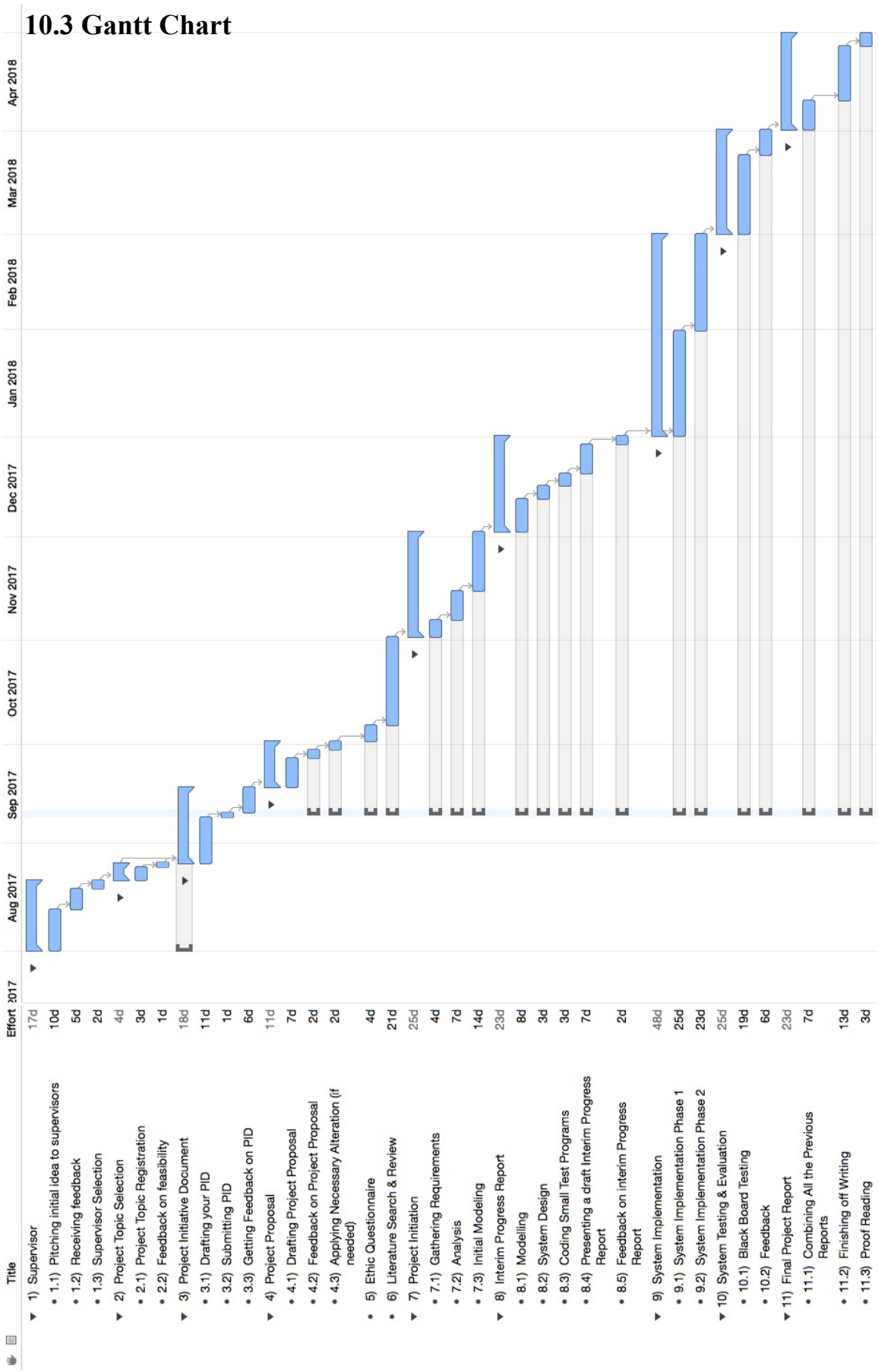

Figure 2: Gantt Chart

11 References

Agilemanifesto.org. (2017). *Manifesto for Agile Software Development*. [online] Available at: http://agilemanifesto.org/iso/en/manifesto.html [Accessed 7 Nov. 2017].

Burke, B. (2017). *Gamification 2020: What Is the Future of Gamification?*. [online] Gartner.com. Available at: https://www.gartner.com/doc/2226015/gamification--future-gamification [Accessed 15 Nov. 2017].

Scrumalliance.org. (2017). *Agile Gamification - Scrum Alliance*. [online] Available at: https://www.scrumalliance.org/community/articles/2014/august/agile-gamification [Accessed 9 Nov. 2017].

Westland, J. (2017). *Project Management Methodology - An Overview*. [online] ProjectManager.com. Available at: https://www.projectmanager.com/blog/project-management-methodology [Accessed 10 Nov. 2017].

12 Bibliography

Buckley, P. and Doyle, E., 2017. Individualising gamification: an investigation of the impact of learning styles and personality traits on the efficacy of gamification using a prediction market. *Computers & Education*, *106*, pp.43-55.

Chou, Y.K. 2013. The 8 Core Drives of Gamification (#2): Development and Accomplishment. [ONLINE] Available at: http://yukaichou.com/gamification-study/8-core-drives-gamification-2-development-accomplishment/. [Accessed 10 September 2017].

da Rocha Seixas, L., Gomes, A.S. and de Melo Filho, I.J., 2016. Effectiveness of gamification in the engagement of students. *Computers in Human Behavior*, *58*, pp.48-63.

Dubois, D.J. and Tamburrelli, G., 2013, August. Understanding gamification mechanisms for software development. In *Proceedings of the 2013 9th Joint Meeting on Foundations of Software Engineering* (pp. 659-662). ACM.

Hamari, J, Koivisto . J, Sarsa. H, (2014). Does Gamification Work? - A Literature Review of Empirical Studies on Gamification. In International Conference on System Science. Hawaii, 2014. Hawaii: IEEE. pp3025 - 3034.

He.palgrave.com. (2017). *Choosing appropriate research methodologies.* [online] Available at: https://he.palgrave.com/studentstudyskills/page/choosing-appropriate-research-methodologies/ [Accessed 16 Nov. 2017].

Hsu, C.L., Chen, Y.C., Yang, T.N. and Lin, W.K., 2017. Do website features matter in an online gamification context? Focusing on the mediating roles of user experience and attitude. *Telematics and Informatics*, *34*(4), pp.196-205.

Lombriser, P. and van der Valk, R., 2011. Improving the Quality of the Software Development Lifecycle with Gamification.

Lotz, M. 2013. Waterfall vs. Agile: Which is the Right Development Methodology for Your Project?. [ONLINE] Available at: https://www.seguetech.com/waterfall-vs-agile-methodology/. [Accessed 8 September 2017].

Mora, A., Riera, D., Gonzalez, C. and Arnedo-Moreno, J., 2015, September. A literature review of gamification design frameworks. In *Games and virtual worlds for serious applications (VS-Games), 2015 7th international conference on* (pp. 1-8). IEEE.

Robson, K., Plangger, K., Kietzmann, J.H., McCarthy, I. and Pitt, L., 2015. Is it all a game? Understanding the principles of gamification. *Business Horizons*, *58*(4), pp.411-420.

Schwaber, K., 1994. Scrum Development Process. Advanced Development Methods, 1, 23.

Smartsheet. (2017). *What's the Difference? Agile vs Scrum vs Waterfall vs Kanban*. [online] Available at: https://www.smartsheet.com/agile-vs-scrum-vs-waterfall-vs-kanban [Accessed 16 Nov. 2017].

Socscidiss.bham.ac.uk. (2017). *Research methodologies*. [online] Available at: http://www.socscidiss.bham.ac.uk/methodologies.html [Accessed 16 Nov. 2017].

13 Appendices

[2] Extrinsic rewards: Are Physical rewards, such as money, stocks, prizes, and commissions

[1] Intrinsic rewards: Are nonphysical rewards, such as recognition, status, altruism, honor, mastery, and purpose